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ABSTRACT

The School District Data Book (SDDB) of the National Center for Education Statistics contains data on local education agencies that make it possible to compare data aggregated at district, county, state, and national levels on hundreds of variables. The development of the SDDB has provided an efficient and powerful tool for use in planning and assessment in the Tucson (Arizona) Unified School District #1 (TUSD). TUSD is the largest district in southern Arizona, serving 60,525 students in an approximately 227 square mile area. Profiles of student results are one of the primary sources of data used in the TUSD. Student, school, and district profiles are compared with state and national results. Using SDDB data, an example analysis was performed to identify the relationships among various socioeconomic conditions, school characteristics, and academic performance. Results of a factor analysis indicated the need for at least two explanatory variables (i.e., socioeconomic status and a school environment variable). The District has found other software useful in conjunction with SDDB data, and expects to use this approach for other planning and evaluation activities. Appendixes present the district profile, SDDB profiles in three tables, and a SDDB map of Arizona by county for children below the poverty level. (SLD)

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Research Application of the National Center for Education Statistics School District Data Book: Lessons Learned from Five LEAs Across the Nation

Planning and Assessment Applications of the School District Data Book in Tucson Unified School District #1

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Planning and Assessment Applications of the School District Data Book in Tucson Unified School District #1

Introduction

The development of the School District Data Book (SDDB) by the National Center for Education Statistics (NCES) provides an efficient and powerful tool for the generation of data for use in Tucson Unified School District #1 (TUSD's) planning and assessment process. The SDDB is a CD-ROM based program containing district mapping (TIGER System) information, and a database of information from the 1990 Census, NCES' Common Core of Data, and Financial data from the Survey of School District Finances. Data contained in the SDDB provides for a variety of comparisons which, while previously available, were not readily available (e.g., state by district, and nation by state or district data for students living in poverty).

TUSD is the largest school district in Southern Arizona, including 73 elementary schools, 19 middle schools, and 10 high schools (See Appendix A). In addition, 9 alternative educational facilities provide special programs. TUSD serves residents of an approximately 227 square-mile area, encompassing nearly all of the City of Tucson and adjacent areas of Pima County.

A total of 60,525 students were enrolled in the 1993-94 school year. Minority student enrollment included approximately 40% Hispanic, 6% African American, 4% Native American, and 2% Asian American students.

TUSD has adopted a results driven strategic planning process (i.e., *ACTion 2000*) to ensure continuous improvement in the academic performance of all students. Profiles of student results provide one of the primary sources of data utilized by the District in this process. The Profiles (Student, School, and District) provide comparison data among a variety of populations. Individual student performance is tracked over time, in a criterion referenced framework. Groups of students (e.g., grade levels at a particular school) are compared to the District averages of students at the same grade level. Individual school data is compared to the District average for all schools, and District results are compared to State and National results where available. These comparisons are used to provide an external reference to local performance. These external references help temper judgments made in regard to the quality of both input and outcome results.

Policy and research issues

SDDB data will be used primarily to provide the information needed to satisfy the requirements of the strategic planning process. Reports prepared through the use of the SDDB will supplement information collected from students, schools, and the total district. Research issues to be explored include providing data which will serve to condition local results. An example of this would be to analyze student performance variables (e.g., norm referenced test results, dropout rates), given the number of families living below the poverty level.

SDDB provides over 200,000 data elements for each school district and county in the United States. Since the SDDB contains such a vast amount of information, an attempt to derive a valid conclusion on the condition of education requires an accurate and comparable set of data elements for the district. (Appendix B presents some of the standard profiles, and associated variables available through the SDDB for TUSD.)

Using data from the SDDB, an example analysis was performed to identify the relationships among various socio-economic conditions, school characteristics, and academic performance. A variety of indicators were selected from the SDDB for all school districts in Arizona. An initial principal components analysis was performed to explore the possibility of a latent structure among the variables initially selected. (See Table 1)

Results of the factor analysis indicated the need for at least two explanatory variables, socio-economic status (SES) and a school environment variable (School). For socio-economic status, five indicators were selected, household median income (D018), percent non-Hispanic White (D042 through D047), percent civilian employed (D050, D051), percent of relevant students living below the poverty level (D082), and the percent completed high school and above (D052 through D055). The school characteristics included the student to teacher ratio (STUDENTS and TEACHERS) and the current instructional program expenditures (F33). The academic performance indicator was the average NCE scores for ITBS/TAP Reading and Mathematics.

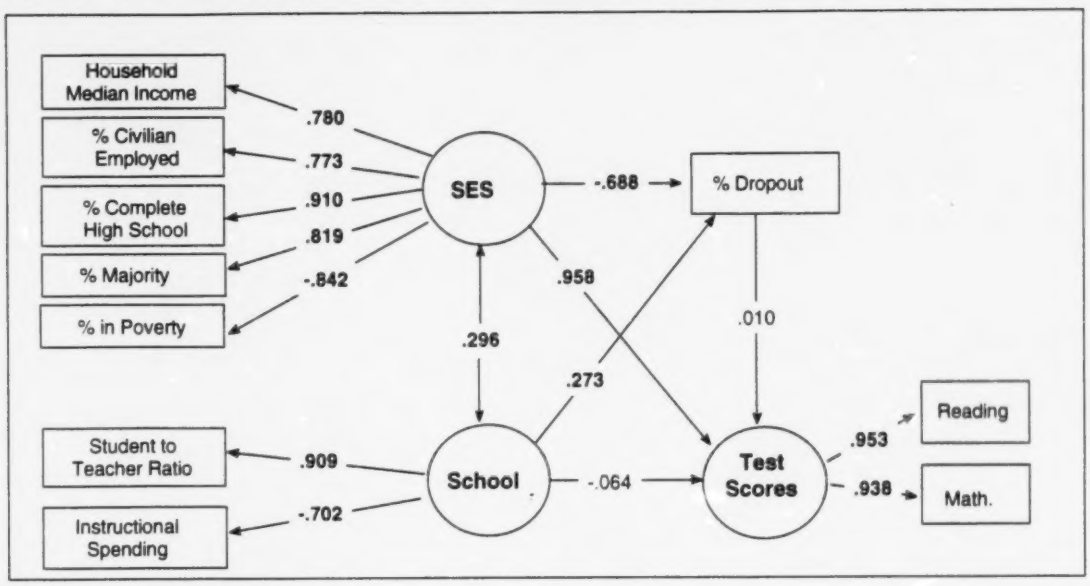
Table 1. Factor loadings (varimax normalized) extracted by Principal Components

Indicators	Factor 1	Factor 2
Household median income	**.7751**	.2345
% non-Hispanic White	**.8681**	.0110
% civilian employed	**.8020**	.1019
% children in poverty	**-.8695**	-.1604
% high school completion	**.8850**	.1284
Student to teacher ratio	.1471	**.9089**
$ spending on instruction	-.1092	**-.8980**
Explained Variance	3.5703	1.7404
Proportion Total	.5100	.2486

Note: **Bold-faced** loadings are > .7000.

The model (See Figure 1), though simple and tentative, clearly indicates that socio-economic conditions are the most significant contributor to academic achievement. School characteristics were found to be inversely related to academic achievement. However, the model itself turned out not to have a particularly good fit. (The chi-square test for the model was $X^2_{(31)} = 168.8$ and the Comparative Fit Index - .897.) This lack of fit can be attributed to the small number of available indicators for school characteristics (only student/teacher ratio and instructional spending were available in the SDDB database for inclusion in the model). It is anticipated that the addition of measures such as parental involvement, discipline, school leadership, and other variables known to correlate with school effectiveness. would lead to a much better fit. The negative path coefficient for school environment characteristics (-.064), based upon student to teacher ratio and instructional expenditures, while not significant, is troubling. This can probably be explained by the fact that expenditures for instruction tend to be non-linear, unlike

Figure 1. Pilot Model to Predict Student Achievement Based on SDDB Data



Significant Path Coefficients in **Bold**
note: error terms not presented for clarity

other indicators of socio-economic conditions. (See the correlations between Instructional Spending and Household Median income and Instructional Spending and Reading Performance in Table 2). The fact that school districts with large numbers of low income families also tend to have high educational expenditures for programs such as Title I probably explains this negative correlation.

Table 2. Correlation matrix among indicators

Indicators	1	2	3	4	5	6	7	8	9	10
1. Household median income	1.0	.52	.70	.50	-.73	.35	-.20	-.28	.63	.57
2. % non-Hispanic White	.52	1.0	.60	.72	-.60	.14	-.28	-.10	.66	.56
3. % civilian employed	.70	.60	1.0	.73	-.75	.28	-.18	-.41	.76	.67
4. % children in poverty	.50	.72	.73	1.0	-.68	.14	-.16	-.36	.80	.71
5. % high school completion	-.73	-.60	-.75	-.68	1.0	-.28	.21	.48	-.68	-.58
6. Student to teacher ratio	.35	.14	.28	.14	-.28	1.0	-.68	-.04	.11	.13
7. $ spending on instruction	-.20	-.28	-.18	-.16	.21	-.68	1.0	-.09	-.06	.01
8. Dropout	-.28	-.10	-.41	-.36	.48	-.04	-.09	1.0	-.41	-.39
9. Reading	.63	.66	.76	.80	-.68	.11	-.06	-.41	1.0	.86
10. Math	.57	.56	.67	.71	-.58	.13	.01	-.39	.86	1.0

Other software used in conjunction with SDDB.

The Department of Planning and Assessment in TUSD relies heavily on the use of FoxPro for Windows in the development of reports for the District. SDDB has the capability of downloading selected variables in X-base (.dbf) format. This download capability will be used to provide data for use in the analysis of data for inclusion in TUSD's profiles.

Statistica for Windows was used to perform the factor analysis and generate the correlation matrix, while EQS/Windows was used to estimate the model coefficients.

Data presentation methods.
As indicated above, data generated by SDDB will be included in the TUSD's School and District Profiles. Data generated through SDDB will be used directly, as seen in the profiles (Appendix B), but will also be used to condition local school environment data.

District audiences identified.
All levels (teachers, schools, district administrators, and the governing board) in TUSD are involved in the *ACTion 2000* strategic planning process. They will serve as the primary audiences and users of the Profiles containing information from SDDB.

New insights obtained through the analysis.
Comparisons of results for TUSD to those from state and national levels have helped to focus attention on factors affecting student performance. In particular, an analysis of factors (e.g., poverty level, parents' education) over which school districts have no control has been useful.

The organizational response of the school district to the data.
One of the major efforts in the TUSD reform movement has involved professional and organizational development. Information from the SDDB, combined with data previously available in the district, will help to inform decisions regarding appropriate training activities. This information will also be included in the discussion of appropriate curriculum and instruction programs and initiatives at the sites.

Recommendation for the enhancement of the SDDB software.
Problems were encountered with the mapping (GIS) software contained within the SDDB. The printing of state by county maps (my version of SDDB does not contain the boundary files for state by district mapping in Arizona) was successful (See Appendix C), but printing U.S. by state maps locked up the computer, requiring a "cold boot".

Problems encountered when preparing data for this paper included at least two Arizona school districts not having an associated county code. Additionally, when compiling district-level data upward into county-level data, K-6 and K-8 feeder districts duplicate data that has already been compiled under their receiving high school district. Take, for example, a hypothetical county which has two K-8 districts, each containing 5,000 households. These two districts would combine to form a high school district containing 10,000 households. When you aggregate the number of households by county, the overlapping jurisdictions of these districts erroneously doubles the number of households in the county.

Some inconsistencies can be found in the numbers in ethnic and gender breakdown. The number of relevant children (D058) did not match with the sum of male (D063) and female (D064) relevant children. For 222 unique school districts checked (excluding records marked BOC, which presumably stands for "Belong to Other County"), the sum of D058 was 841,550 while the sum of D063 and D064 was 841,547. Also, the sum of D058 and the sum of relevant children of different ethnic backgrounds (D065 through D070) differ by 12 children. A more notable discrepancy was found in the statistics of educational attainment (D052 through D055) among persons 20 years and over. The sum of D052 through D055 did not match with persons 20 years and over - the number of total persons (D035) minus total children (D058).

The data set contains a vast amount of information on school districts. For this study, only a small portion of available data were used. Besides checking the data for possible errors and inconsistencies, the most time-consuming process was generating comparable indicators across the district (e.g., student/teacher ratio, average school size). In this process, most data should be converted to the same scale using appropriate denominators. Since there is not yet a set of standard indicators (with the exception of educational indicators such as graduation rates, dropout rates) for the conditions of education, it could be a formidable task to try to find appropriate denominators for all of the data contained in the SDDB.

Research design implications/recommendations for future NCES and Census Bureau data collection projects.

Inclusion of data at either the Zip Code + 4 or block level data would be useful. In particular, because we are not able to legally collect Free and Reduced Lunch information, it would be helpful to be able to get households in poverty data at this level. Additional school level information (e.g., length of teacher service) would also be a useful addition to SDDB.

APPENDIX A

TUCSON UNIFIED SCHOOL DISTRICT
Department of Planning and Assessment

District Profile Summary for 1993-94

		1992-93	1993-94
• Enrollment		58,891	60,525
• Percent minority		50.7%	51.3%
• Number of teachers		2,901	2,953
• Number of support staff		2,738	2,881
• Number of administrators		198	205
• Revenues (in millions)		$257.2	$269.4
• Expenditures (in millions)		$250.6	$268.4
• Educational cost per student		$3,916.7	$3,924.5
• Student attendance rate		93%	92%
• Promotion rate (grades K - 8)		99.2%	99.8%
• Dropout rate (grades 7 - 12)		6.9%	8.1%*
• Total number of suspensions		5,699	6,655
• Mobility rate		26%	36%
• Stability rate		89%	81%
• Students per classroom teacher		22.0	22.3
• Percent receiving Free/Reduced lunch		49%	52%
• Awards/Honors:	Student	2,050	2,108
	Teachers	90	55
	Other	116	81
• Number of volunteers		11,694	19,431
• Total hours volunteers served		58,247	122,255
• Scholastic Aptitude Test (SAT):	Verbal	446	445
•	Mathematics	503	496
• American College Testing (ACT):	Composite	21.1	21.2
• Percent satisfied with school:	Student	72%	73%
	Parent	89%	90%
	Teacher/Admin.	88%	90%
	Support Staff	NA	89%

* This figure includes 540 students technically considered "dropouts" who are currently enrolled.
NA: Data are not available.

APPENDIX B

SDDB Profile Reports for Tucson Unified School District #1

**** School District Data Book ****
District Financial Profile (101)

Primary Area.....TUCSON UNIFIED SCHOOL DISTRICT 1
Comparison Area 1..ARIZONA
Comparison Area 2..United States Total

State-District Codes:		Primary Area 04-08800	Area 1 04-00000	Area 2 00-00000
Students		62,012	607,615	40,573,365
Total Revenue per Student	$	3,937	4,761	5,154
Local Taxes per Student		1,345	1,751	1,568
Parent Govt Contribution/Student		0	0	438
State Revenue per Student		1,842	1,969	2,446
Federal Revenue per Student		284	392	302
Total Expenditure per Student	$	4,005	4,874	5,212
Current Spending per Student		3,652	3,910	4,684
Instructional Expenditure/Student		2,074	2,282	2,794
Support Services Spending/Student		1,442	1,467	1,601
TOTAL REVENUE BY SOURCE (000's)	$	244,130	2,892,838	209,104,586
Percent Local		45.98	50.43	46.67
Percent from Property Tax		34.18	36.78	29.65
Percent Parent Government		0.00	0.00	8.51
Percent Local Intergovernmental		3.79	3.49	1.38
Percent Charges		2.01	2.56	2.90
Percent State Sources		46.80	41.35	47.46
Percent Federal Sources		7.22	8.23	5.87
TOTAL EXPENDITURES (000's)		248,362	2,961,338	211,456,830
Percent Current Instruction Program		87.78	76.92	84.31
Percent Instruction		51.79	46.82	53.60
Percent Support Services		35.99	30.10	30.71
Percent Current Noninstructional		3.41	3.30	5.55
Percent Capital Outlay		6.22	15.16	8.17

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**** School District Data Book ****
Administrative Profile - Summary (105)

Primary Area.....TUCSON UNIFIED DISTRICT #1
Comparison Area 1..ARIZONA
Comparison Area 2..United States Total

State and District Codes	Primary Area 04-08800	Area 1 04-00000	Area 2 00-00000
Number of Students	55,737	615,475	39,858,731
Percent Free Lunch Eligible	0.00	0.00	8.47
Percent Amer. Indian/Alaska Native	3.16	7.03	0.86
Percent Asian & Pacific Islander	2.26	1.55	2.95
Percent Hispanic	37.23	25.26	10.58
Percent Black, Not Hispanic	6.14	4.35	14.55
Percent White, Not Hispanic	59.34	68.19	61.70
in Schools by Enrollment Size			
Percent Under 100 Students	0.49	0.61	0.89
Percent 100 - 199 Students	0.79	1.37	3.31
Percent 200 - 299 Students	5.21	2.57	6.24
Percent 300 - 399 Students	10.40	5.52	10.33
Percent 400 - 499 Students	21.81	8.29	12.47
Percent 500 - 599 Students	12.87	13.25	12.73
Percent 600 - 699 Students	17.31	11.34	10.89
Percent 700 - 799 Students	5.22	11.44	8.52
Percent 800 - 999 Students	0.00	16.63	11.48
Percent 1,000 - 1,499 Students	9.23	11.88	13.10
Percent 1,500 or More Students	16.67	17.10	10.05
in Schools by Urban/Rural Category			
Percent Large Central City	0.00	23.82	13.30
Percent Mid-Size Central City	81.75	28.80	16.63
Percent Urban Fringe of Large City	0.00	13.74	17.52
Percent Urban Fringe of Midsz City	18.25	3.75	11.97
Percent Large Town	0.00	4.63	2.34
Percent Small Town	0.00	18.80	21.68
Percent Rural Territory	0.00	6.46	16.55
in Schools by Type of School			
Percent Regular Schools	98.53	98.82	99.05
Percent Special Education Schools	0.29	0.09	0.32
Percent Vocational Schools	0.00	0.21	0.28
Number of Schools	104	1,010	81,370
Percent Regular	93.27	95.64	96.24
Percent Special Education	2.88	1.29	1.56
Percent Vocational	0.00	0.59	0.86
by Urban/Rural Category			
Percent Large Central City	0.00	19.01	9.13
Percent Mid-Size Central City	83.65	25.05	14.12
Percent Urban Fringe of Large City	0.00	10.20	14.24
Percent Urban Fringe of Midsz City	16.35	3.17	9.87
Percent Large Town	0.00	3.86	2.20
Percent Small Town	0.00	23.07	22.84
Percent Rural Territory	0.00	15.64	27.58
Number of Teachers	2,497	30,922	2,235,169
in Schools by Urban/Rural Category			
Percent Large Central City	0.00	24.06	12.80
Percent Mid-Size Central City	80.90	27.43	16.18
Percent Urban Fringe of Large City	0.00	13.25	16.78
Percent Urban Fringe of Midsz City	19.06	3.56	11.92
Percent Large Town	0.00	4.48	2.27
Percent Small Town	0.00	19.65	21.97
Percent Rural Territory	0.00	7.55	18.05

**** School District Data Book ****
General Characteristics Profile-Summary (001)

Primary Area.....TUCSON UNIFIED DISTRICT #1 State ID: 100201
Comparison Area 1..ARIZONA
Comparison Area 2..UNITED STATES

		Primary Area	Area 1	Area 2
State-County-District Codes		04-000-08800	04-00000	00-00000
Metropolitan Area (MSA) Code		00-8520	00-0000	-
County Code (Some Districts)		019	000	
Zip Code (Some Districts)		85717	00000	
Grade Range (Districts)		PK-12	00-00	00-00
Total Persons		393,629	3,665,228	248,709,873
Percent Urban		97.18	87.50	75.21
Percent White		66.80	71.81	75.76
Percent Black		3.92	2.87	11.77
Percent Asian/Pacific Islander		1.97	1.40	2.81
Percent Hispanic		25.60	18.57	8.81
Percent in Poverty		17.09	15.40	12.76
Total Housing Units		174,344	1,659,430	102,263,678
Median Housing Value	$	72,568	79,680	78,500
Median Household Income	$	24,449	27,540	30,056
Per Capita Income in 1989	$	12,653	13,461	14,420
Total Children		80,800	843,522	55,325,634
Enrolled		65,140	675,205	45,745,358
Percent Public of Those Enrolled		86.87	91.67	87.18
Percent Private of Those Enrolled		13.13	8.33	12.82
Percent Urban		96.58	85.24	72.82
Percent White		52.86	59.88	68.92
Percent Black		4.81	3.52	14.77
Percent Asian and Pacific Islander		1.90	1.42	3.10
Percent Hispanic		37.94	26.89	12.04
Percent in Poverty		22.22	21.38	17.84
Students per Teacher		22	19	17
Total Revenue per Student	$	3,937	4,761	5,154
Federal Revenue per Student	$	284	392	302
Total Expenditure per Student	$	4,005	4,874	5,203

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APPENDIX C

SDDB Map of Arizona by County
for Children Below Poverty Level (D082)

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